

## **Frostbite Camp 2019**

### **Frostbite Technique Curriculum, Part 2 – Kayak Modules**

#### **by Dan Henderson**

#### **1. Top hand position**

- When taught
  - This should be the very first technique element taught to beginning paddlers
  - Once beginners have basic stability, they are able to learn top hand position
  - This requires strength in the top shoulder, especially middle deltoid. That's the elbow lifting muscle.
- Why
  - To maximize power, the paddle must be as vertical as possible throughout the entire power phase on Frontal (viewed from ahead or behind) and Sagittal (viewed from the side) planes
  - The vertical position of the paddle is mostly determined by the top hand position
- Teaching elements
  - The top hand position is in front of the forehead with elbow slightly bent
    - This is the position from the moment the blade is in the water until the beginning of the exit
    - This also places the top hand above the center of buoyancy of the kayak, which is critical for loading
    - General paddle position throughout the Power Application Phase
      - Top hand must be over center of buoyancy of the kayak
      - Top hand must be in a position that can support body weight
      - Over the center line of the kayak at forehead height
    - Top hand vector for beginner is static through the Power Application Phase, then at the exit it extends forward.
    - When the paddler is able to load body weight, which is usually after s/he can use legs, hips, torso, and shoulders for rotation, the vector goes down the paddling shaft. See section 3.
  - At the exit
    - The exit of one stroke determines the set-up for the next
    - As the exit begins, the top hand extends forward, but not down, to help accelerate the blade being removed from the water and to set up for the next stroke
    - It stays up until the pulling hand is raised to the same height
    - With both hands up, it's possible to use both hands to generate power for the next stroke starting right at the catch

- The set-up position for each stroke is with both hands at forehead height, with shaft horizontal, blades oriented fore and aft
- Pause drill, with both hands up in the set-up position at forehead height, is often helpful in learning the positioning and developing stability in that position. This can be done on shore before doing it in the kayak.
- Things to look for
  - Relatively vertical paddle shaft on both Frontal and Sagittal Planes
  - Top hand position at forehead height
  - Elbows point downwards and not to the side
  - Shoulders are in a neutral position and not shrugged. Beginners may need to be told to hold their shoulders down
  - Both hands come all the way up between strokes and before the next stroke is taken
  - Top shoulder middle deltoid fatigues more quickly – that's the elbow abduction (lifting) muscle
  - The tip of the paddle blade enters the water first, rather than the side of the blade
  - The paddler is able to catch with the blade closer to the side of the kayak
  - Increased fatigue due to generating more power and placing greater demands on CV system
- Common mistakes – all of which dump power
  - Dropping the top hand midway through the stroke. The top hand either gets lower and lower as it moves forward or dips and comes back up.
  - Extending the top hand forward midway through the stroke
  - Slowing the paddle towards the back of the stroke to brace
  - Holding the top hand too high midway through the stroke
  - Top hand too wide (ex: in front of the shoulder) and not centered in front of the forehead over the center of buoyancy of the kayak

## 2. Upper body rotation - Shoulder and torso twist, 1<sup>st</sup> Horizontal Component of Force

- When taught
  - Upper Body Rotation is the second technical aspect beginners can learn. Beginners can generally get this once they have their basic stability and can hold their top hand in position most of the time
  - Requires good solid deep and upper abdominal muscles – Transverse Abdominis, Rectus Abdominis, Internal and External Oblique muscles.
- Why
  - Extends the length of the Power Application Phase
  - Extend the duration the paddle is held in a vertical position on the Sagittal Plane during the Power Application Phase

- Engage larger and more powerful muscles of the torso and lower body
- Teaching elements
  - This rotation comes from twisting spine from side to side. The onside shoulder pulls back while the onside shoulder pushes forward.
  - This is combined with extending the onside hand and arm forward by straightening the onside elbow
  - The first step is to make certain the onside elbow is nearly straight
  - Then get the shoulders moving forwards and backwards – the onside shoulder pulls backwards while the offside shoulder pushes forwards.
  - This should extend the reach and catch position relative to the kayak forward
  - Force vectors are generally forwards and backwards on the transverse plane. Resulting rotation is around the spine. Shoulder joint should remain static during this motion with rotation coming from the upper vertebrae of the spine.
  - Once reasonable stability is achieved with shoulder rotation, this can then be extended to the waist
  - There should be no side-to-side movement as the rotation is on the axis of the spine. Describe as having a pole extended from their buttocks through the top of their head around which they rotate
  - Focus the beginner on grabbing the water and pulling themselves forward
  - This should increase boat speed substantially
  - Power phase ends when the pulling hand is just in front of the hip. If the paddle is pulled through farther, the stroke becomes a brace. Quickly exit as the hand reaches the hip.
  - Then with the paddle out of the water, continue the torso rotation (Counter-Rotation) with the paddle in the air to set up for a catch farther forward
- Things to look for
  - One shoulders moves forwards while the other moves backwards
  - Paddle immersed farther forward at the catch
  - Twisting at the waist
  - Chest and back become more and more visible when viewed from the side
  - Increased fatigue due to generating more power and placing greater demands on CV system
- Common mistakes
  - Collapsing the interior shoulder angle and pushing the top hand across in front of their body (shoulder internal rotation)
  - Rocking forwards and backwards to try to reach forward more
  - Leaning from side-to-side instead of rotating
  - Leaning away from the onside towards the offside

### 3. Lower Body Power – 2<sup>nd</sup> Horizontal Component of Force

- When Taught
  - Good solid stability with paddle vertical and Upper Body Rotation
  - In addition to muscles used for Upper Body Rotation, requires good core strength, particularly from pelvic floor and lower abdominal muscle strength.
- Why
  - Engages the large leg and hip flexor and extensor muscles, as well as ankle flexor muscles, to generate horizontal rotational torque
    - Onside Leg drive – hip, knee, and ankle extensors
    - Offside Leg flexion – hip, knee and ankle flexors
  - Creates rotation torque on Transverse Plane which accelerates Sagittal Plane torque
- Teaching elements
  - Push and pull with legs
  - Lock the paddle in the water then apply initial power with legs
  - Body movement becomes incremental – starting with ankles, then knees, then hip drive. Then onto torso, then shoulder rotation, finishing with top arm extension to exit
  - Drill moving the boat with legs only and then exiting before Upper Body Rotation
- Things to look for
  - Knees moving up and down
  - Hips moving forwards and backwards
  - Increased torso rotation
  - Increased stroke length in front – catch point farther forward
  - Kayak moves more powerfully earlier in the stroke – greater acceleration
  - Increased fatigue due to generating more power and placing greater demands on CV system
- Common mistakes
  - Leaning the hips away from the onside – avoids applying body mass to the paddle
  - Legs pumping with no connection to moving the kayak – usually legs move before paddle locked in

### 4. Loading, locking In, Vertical Component of Force (The Difference Maker!)

- When Taught
  - After the paddler learns reasonable stability, top hand position is absolutely critical, and has reasonable upper and lower body rotation
  - Requires additional deltoid and core strength
- Why

- This is the vertical component of force
- Key to applying body mass to the paddle, a key component of generation torque
- Focuses more of the paddle force through the footboard, rather than the seat, resulting in a stronger direction of force application (vector) to propel the kayak forward
- Teaching elements
  - This is the pole vault thing – it's a lifting motion
  - It starts as soon as weight can be supported on the paddle at the catch, and is held throughout the stroke
  - Top hand must be held over the center of buoyancy of the kayak
  - Force is directed down the length of the shaft to lift the body on the paddle blade – this applies mass
  - There should be a sensation of lifting the butt off the seat
  - On shore, have the kayaker sit in a chair and holding a piece of dowel, like a closet rod. Hold the dowel like a kayak paddle. Put one end on the ground, like in the catch position in the kayak. Try to lift butt off the chair with force only on the dowel. Do this on each side.
  - On the dock, have the kayaker sit at the edge. The kayaker places the paddle in the water in the catch position. The coach reaches into the water and holds the tip of the blade in his/her hand. The kayak presses straight down the shaft into the coach's hand. Once that is solid, then the kayaker tries to lift her/his butt off the dock. The butt never actually raises, but the sensation of lightening weight on the buttocks is important. This can be repeated with the paddler in the kayak and the coach in the launch.
  - This is incredibly destabilizing because the kayaker is taking as much of their body weight as possible and throwing it onto the paddle. Once a stroke is finished, the body weight is brought back over the center of buoyancy of the kayak and then thrown to the other side for the next stroke. The degree to which maximum body weight can be applied onto the paddle can be developed incrementally.
- Things to look for
  - The kayaker feels abdominal muscles engaging more
  - Paddle blade flutter in the water is eliminated
  - The kayak accelerates more quickly at the beginning of each stroke
  - The bow of the kayak comes up faster at the catch
  - The rooster tail at the stern of the kayak increases in size
  - Increased top shoulder (deltoid) fatigue
  - Increased fatigue due to generating more power and placing greater demands on CV system
- Common mistakes
  - Kayaker focuses on downward force of the body, rather than lifting on the paddle, resulting in hunching over
  - Top hand punches forward, with force going forward, instead of down the shaft

- The top elbow dips down and then up during the power application phase, acting as a shock absorber
- Kayaker leans away from the paddling side to xxx

## **5. Starts**

- When Taught
  - Once basic stability is attained
  - After about 6 weeks
- Why
- Teaching elements
- Things to look for
- Common mistakes

## **6. Group paddling**

- When Taught
- Why
- Teaching elements
- Things to look for
- Common mistakes
- Common mistakes